

IMPROVED MOTOR BRUSH HOLDER AND ALIGNMENT ASSEMBLY

TECHNICAL FIELD

5 The present invention is directed to a motor assembly, and more particularly to an assembly that aligns the brushes with the magnets and commutator in the motor.

BACKGROUND ART

10 Consistent, reliable motor performance depends on proper alignment between the brushes, the commutator, and the magnets in the motor. In a conventional motor structure, the brushes are located in a brush housing and the commutator and magnets are located in a motor housing.

15 The two housings are joined together to form the motor assembly. To align and join the two housings, a known motor housing structure may include flats that engage with ribs formed on the brush housing to align the motor assembly. A variation of the above-described conventional

20 structure includes peg-like structures in the brush housing that frictionally engage with holes drilled in flanges extending outwardly from the motor housing.

Prior art motor assemblies, however, depended on following precise tolerances in the positioning of the magnets and commutator within the motor housing with respect to the flanges on the outside of the motor housing.

5 Because the magnet position within the motor housing, the flange position, the brush position, and the fit tolerances are all independently variable with respect to each other, obtaining consistent alignment of the brushes with both the commutator and the magnets can be difficult because the
10 magnets must first be positioned precisely in the motor housing with respect to the flanges, and the tolerances of the flanges must be precise enough to ensure that the brushes are correctly aligned with the magnets and commutator. These variables tend to cause performance
15 variations as well as added complexity in the manufacturing process.

There is a need for a motor housing assembly that improves the alignment of the brushes to the magnets and the commutator and minimize performance variations from
20 motor to motor.

SUMMARY OF THE INVENTION

Accordingly, the present invention is directed to a motor housing assembly that includes a motor housing, a pair of magnets disposed within the motor housing in a spaced relationship to form at least one space, and a brush holder having at least one tab that fits within said at least one space in between the pair of magnets. One preferred embodiment positions the magnets within the housing to form two spaces lying opposite each other. The brush housing in this embodiment has two tabs that extend into the two spaces formed by the magnet pair.

Because the present invention aligns the brushes based on the magnet position and not on physical attributes of the motor housing, such as external flanges, the inventive structure prevents the brush position from being completely independent of the magnet position, as in prior art devices. Instead, the inventive structure aligns the brushes based on the magnet position, thereby ensuring a consistent positional relationship between the magnet and the brushes from device to device.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an exploded view of a motor housing assembly of the present invention;

Figure 2 is an isometric view of the motor housing interior in the present invention; and

Figure 3 is a sectional view of the motor housing assembly of the present invention after the motor housing and brush holder shown in Figures 2 and 3 are assembled together.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 is an exploded view of the motor housing assembly 100 of the present invention, and Figure 2 is an isometric view of a motor housing used in the assembly 100.

The assembly 100 includes a motor housing 102 that holds a pair of magnets 104, 106. The magnets 104, 106 are preferably attached to the motor housing 102 in a spaced relationship to form two spaces 108, 110 that are disposed opposite each other, as can be seen more clearly in Figure 2. These spaces 108, 110 will be used for aligning brushes with the magnets 104, 106, which be explained in greater detail below. Because the inventive assembly 100 does not rely upon engagement of any portion of the motor housing

102 for brush alignment, the motor housing 102 does not require the magnets 104, 106 to be positioned precisely with respect to any flanges or any other portion of the motor housing 102.

5 The assembly also includes a brush holder 112 that holds several brushes (not shown) and has a pair of tabs 118, 120 extending from the main body portion 116. The spacing and position of the tabs 118, 120 correspond with the position of the spaces 108, 110 between the magnets in
10 the motor housing 102 so that the tabs 118, 120 extend into the motor housing 102 via the spaces 108, 110, as can be seen in Figure 3, when the motor housing 102 and the brush holder 112 are assembled together. Preferably, the tabs 118, 120 fit within the spaces 108, 110 in a sliding
15 manner. The brush holder 112 can be made of any material conventionally used to construct brush holders. Further, because the brush holder 112 does not need to engage with any portion of the motor housing 102 in a frictional or interference fit, the tabs 118, 120 do not need to conform
20 to extremely close tolerances.

Referring to Figures 1 and 3, the motor housing 102 and brush holder 112 are assembled together with a commutator 122 and an armature shaft 124, like conventional

motor assembly structures. As can be seen from the
 Figures, the tabs 118, 120 extend into the spaces 108, 110
 formed by the magnets 104, 106 to align the brushes (not
 shown) in the brush holder 112 with the magnets 104, 106
 5 and the commutator 122. After assembly, the tabs 118, 120
 lie on either side of the commutator 122. Because the
 orientation of the brush holder 112, and therefore the
 brushes (not shown), depends on the magnet position, the
 brushes (not shown) will consistently be aligned properly
 10 with the magnets 104, 106 regardless of the motor housing's
 external dimensions and regardless of the magnets' 104, 106
 orientation within the housing. More particularly, the
 magnet/brush alignment in the inventive structure does not
 depend on aligning the magnets 104, 106 with flanges on the
 15 motor housing, nor does it require any frictional
 engagement or an interference fit between any portion of
 the motor housing 102 and the brush holder 112.

The inventive structure therefore uses the operational
 parts of the motor (e.g. the magnets) to align other
 20 operational parts of the motor (e.g. the brushes). This
 structure eliminates the need to position the magnets
 precisely within the motor housing with respect to flanges
 or other structures formed on the housing, preventing the

brush position from being independent of the magnet position and improving the alignment of the brushes to the magnets and to the commutator.

It should be understood that various alternatives to
5 the embodiments of the invention described herein may be employed in practicing the invention. It is intended that the following claims define the scope of the invention and that the method and apparatus within the scope of these claims and their equivalents be covered thereby.